What is it that makes animals look the way they do? There are many different things that go into what a species will look like: climate, camouflage, or looking pretty for a mate are just some of the factors that help shape how an animal looks on the outside. Most of these things that effect what an animal looks like will be from their immediate environment. The environment includes not only where the animal lives but also the predators it encounters, the mates it will try to attract, and the natural conditions it experiences. In this activity, we will specifically see how the predators in a given environment can help shape how populations of an animal will look.

In this activity, we will be looking at a population of worms and how it changes with a shifting environment. Your group will set up an artificial environment. There are three components to this environment. The first component is the population we will be looking at, the worms (prey). In this population, there are two different color worms, there are red skinned worms and green skinned worms. They will be represented by red and green toothpicks. The second component of this activity will be the worm’s physical environment, which in the case of worms is the ground. To represent the ground, we will use colored pieces of paper. This paper will act as the background for the activity. You will play the part of the third component, the Midwestern Worm Hawk (predator). You are a predatory bird whose diet mostly consists of small ground worms. However, the Worm Hawk doesn’t land and pluck its prey from the ground, they swoop in and dive bomb the first unsuspecting worm they see without landing. They lock onto the worm that they want and will not try and get any other worm. You will be snatching the worms from their environment. Remember, when picking out your prey you are supposed to be flying through the air, so you would not have a lot of time to sit and think about which worm you are going to eat. It must be a fast, first glance selection.

For the sake of this activity, we are going to envision that the ground changes from green to red because of strawberry syrup pollution. We will be looking at how the worm population changes under each of these different colored backgrounds. There will be three roles in each of your groups: The predator, the data recorder, and the reproducer. The predator will be the one who picks up the toothpick worms from the ground. Once the different color worms are scattered around on the paper, the predator will look away from the worms and then quickly look back and pick up the first worm they see. The eaten worm will then be put in the stomach bag and permanently removed from the population. The predator will repeat the snatching process five times. The data recorder will then record the original number of worms and the number of worms eaten for each color toothpick. The reproducer will then take the number of worms of each color present and add one worm for each worm present for each respective color. This will represent the reproduction of the worms to create the next generation of worms. The data recorder must then record the final number of worms in generation 1 and the initial number of worms for each color in generation 2. Then the reproducer will place the worm population in the bag and shake up the worms, representing the mixture of phenotypes. Spill the worms out onto the paper and spread them out. The predator will then repeat the previous prey selection method. Your group will repeat this process three times or until the end of the third generation. When the third generation of worms has been finished, switch to the red background paper and begin the process again. Follow the brief instructions below and fill in the data tables with the matching data.

Procedures:

1. Gather the paper bag, the stomach bag, the toothpicks, and the colored backgrounds.
2. Designate who will be the predator, data recorder, and reproducer.
3. Place 5 of each color toothpicks in the bag and shake it up.
4. Dump the bag of toothpicks onto the green paper background.
5. Predator must swoop and pick off 5 worms using the look away and quickly strike method mentioned above.
6. Put the removed toothpicks in a stomach bag.
7. The data recorder must document the number of worms that are eaten from each color and how many are remaining from each color.
8. Pending the amount of worms remaining, the reproducer must add the correct amount of new worms to the population.
9. For each color, record the final number of worms in generation 1 and the original number of worms for generation 2 (they will be the same).
10. Place the original worms for generation 2 in the bag and shake the bag again.
11. Dump the bag of worms onto the paper background.
12. Repeat from step #5 two more times.
13. Continue this process until you are done with three generations of worms.
14. Once three generations are complete, switch to the red paper background.
15. Switch roles in your group.
16. Repeat from step #3.

Pre-activity questions:

What does the title mean by which worm will **win**?

What is predation rate?

What is environmental pressure?

Make a hypothesis about what you think will occur to the population of worms that live under the green environmental background in the beginning of the activity to the end of the activity. And why do you think this will happen?

What do you think the ending outcome will be for the worm population under the red environmental background?

These first two tables are to be used for the green background.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GREEN WORMS** | Original Amount of Worms | Number of Eaten Worms | Number of Offspring (remaining worms x2) | Final Number of Worms (Original – Eaten + Offspring) |
| Generation #1 |  |  |  |  |
| Generation #2 |  |  |  |  |
| Generation #3 |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **RED WORMS** | Original Amount of Worms | Number of Eaten Worms | Number of Offspring (remaining worms x2) | Final Number of Worms (Original – Eaten + Offspring) |
| Generation #1 |  |  |  |  |
| Generation #2 |  |  |  |  |
| Generation #3 |  |  |  |  |

These second two tables are to be used for the red background.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **GREEN WORMS** | Original Amount of Worms | Number of Eaten Worms | Number of Offspring (remaining worms x2) | Final Number of Worms (Original – Eaten + Offspring) |
| Generation #1 |  |  |  |  |
| Generation #2 |  |  |  |  |
| Generation #3 |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **BLUE WORMS** | Original Amount of Worms | Number of Eaten Worms | Number of Offspring (remaining worms x2) | Final Number of Worms (Original – Eaten + Offspring) |
| Generation #1 |  |  |  |  |
| Generation #2 |  |  |  |  |
| Generation #3 |  |  |  |  |

Post-activity questions:

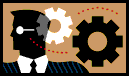
Which population of colored worms “won” under each of the colors of background?

Under what environmental background do you think that both colors would be present?

Explain the Peppered moth scenario and how it applies to this activity.

What other animals do you think are affected in a similar manner as this?

Why Do You Think Humans Look the Way They Do?



How do you think it is that humans have came about to look the ways that we do today? For example, why do we have tan skin, why do we have five fingers, or why do we have things like friendship? Without doing research present your own ideas about the reasoning behind how humans look today in a half page short essay. This is whatever you think the reasoning is behind the characteristics of human beings. It doesn’t have to be accurate reasoning, just what you think it is. Make sure to use your creativity and imagination to paint the portrait of the history of the development of man. Think about what happened to the worm population under different environmental influences. Try to compare what happened here to possible things that may have happened to our ancestors.